

What is claimed:

1. A method for the manufacture of a medicinal composition comprising:
 - (a) Providing a biocompatible polymer of the general formula
$$-[O-R^1-C(O)]_n-$$
wherein:
“R¹” is a linear, branched, or cyclic organic group,
“n” is at least three,
 - (b) Acylating the biocompatible polymer to provide an acylated biocompatible polymer and a mixed anhydride;
 - (c) Reacting the mixed anhydride with a nucleophile to provide an acylated biocompatible polymer with a terminal carboxylic acid derivative capable of being chemically converted to an acid in the absence of water;
 - (d) Converting the terminal carboxylic acid derivative to an acylated biocompatible polymer with a terminal carboxylic acid; and
 - (e) Combining the acylated biocompatible polymer with a drug to provide the medicinal composition.
2. The method as defined in claim 1 wherein R₁ comprises a chain of one to about six carbon atoms.
3. The method as defined in claim 1 wherein R₁ is alkylene or alkenylene comprising heteroatomic functional groups.
4. The method as defined in claim 3 wherein the heteroatomic functional groups are selected from the group consisting of carbonyl, oxy, thio, catenary nitrogen and combinations of two or more of the foregoing.
5. The method as defined in claim 1 wherein R₁ is carbonyl.
6. The method as defined in claim 1 wherein R₁ is lower alkyl or lower alkoxy.

7. The method as defined in claim 6 wherein R_1 is selected from the group consisting of alkyl, alkenyl, alkoxy, alkenylene, alkylene and combinations of two or more of the foregoing, wherein R_1 comprises from about one to about four carbon atoms.
8. The method as defined in claim 1 wherein providing the biocompatible polymer comprises the condensation of an acid to form the biocompatible polymer.
9. The method as defined in claim 8 wherein the acid is lactic acid and the biocompatible polymer is oligolactic acid.
10. The method as defined in claim 9 wherein acylating the biocompatible polymer comprises reacting the oligolactic acid with acetic anhydride to provide acetyl oligolactic acid; and wherein reacting the mixed anhydride with a nucleophile comprises reacting the mixed anhydride with a nucleophile selected from the group consisting of benzyl alcohol, t-butanol, derivatives of benzyl alcohol, derivatives of t-butanol and combinations of two or more of the foregoing.
11. The method as defined in claim 1 wherein the nucleophile is an alcohol selected from the group consisting of benzyl alcohol, t-butanol, derivatives of benzyl alcohol, derivatives of t-butanol and combinations of two or more of the foregoing.
12. The method as defined in claim 1 wherein the drug comprises a substance selected from the group consisting of antiallergics, analgesics, bronchodilators, antihistamines, antiviral agents, antitussives, anginal preparations, antibiotics, antiinflammatories, immunomodulators, 5-lipoxygenase inhibitors, leukotriene antagonists, phospholipase A₂ inhibitors, phosphodiesterase IV inhibitors, peptides, proteins, steroids, vaccine preparations and combinations of any two or more of the foregoing.
13. The method as defined in claim 1 wherein the drug comprises a substance selected from the group consisting of adrenaline, albuterol, atropine, beclomethasone dipropionate, budesonide, butixocort propionate, clemastine, cromolyn, epinephrine, ephedrine, fentanyl, flunisolide, fluticasone, formoterol, ipratropium bromide, isoproterenol,

lidocaine, morphine, nedocromil, pentamidine isoethionate, pirbuterol, prednisolone, salmeterol, terbutaline, tetracycline, 4-amino- α , α , 2-trimethyl-1H-imidazo[4,5-c]quinoline-1-ethanol, 2,5-diethyl-10-oxo-1,2, 4-triazolo[1,5-c]pyrimido[5,4-b][1,4]thiazine, 1-(1-ethylpropyl)-1- hydroxy-3-phenylurea and pharmaceutically acceptable salts and solvates thereof, and combinations of any two or more of the foregoing.

14. Method as defined in claim 1 wherein the drug comprises a substance selected from the group consisting of beclomethasone dipropionate, butixocort propionate, pirbuterol, 4-amino- α , α , 2-trimethyl-1H-imidazo[4,5-c]quinoline-1-ethanol, 2,5-diethyl-10-oxo-1,2,4-triazolo[1,5-c]pyrimido[5,4-b][1,4]thiazine, 1-(1- ethylpropyl)-1-hydroxy-3-phenylurea, and pharmaceutically acceptable salts and solvates thereof, and combinations of any two or more of the foregoing.

15. The method as defined in claim 1 wherein the drug is in solution.

16. The method as defined in claim 1 wherein the drug is in suspension.

17. The method as defined in claim 16 wherein the drug comprises particles having a diameter of less than about 10 micrometers.

18. The method as defined in claim 1 wherein the medicinal composition is in a form that can be administered as an aerosol.

19. A method for the manufacture of a medicinal composition comprising:

- (a) Providing a biocompatible polymer comprising oligolactic acid;
- (b) Acylating the biocompatible polymer to provide acyl oligolactic acid and a mixed anhydride;
- (c) Reacting the mixed anhydride with a tertiary alcohol in the absence of water to provide an ester that can be chemically converted to an acylated acid comprising acyl oligolactic acid, the alcohol having at least one hydrogen in the alpha position;

- (d) Converting the ester to acyl oligolactic acid; and
- (e) Combining the acyl oligolactic acid with a drug to provide the medicinal composition.

20. The method as defined in claim 19 wherein acylating the biocompatible polymer comprises reacting the oligolactic acid with acetic anhydride to provide the acyl oligolactic acid comprising acetyl oligolactic acid and the mixed anhydride comprising a mixed anhydride of acetyl oligolactic acid and acetic acid; and wherein reacting the mixed anhydride with a nucleophile comprises reacting the mixed anhydride with a nucleophile selected from the group consisting of benzyl alcohol, t-butanol, derivatives of benzyl alcohol, derivatives of t-butanol and combinations of two or more of the foregoing.

21. The method as defined in claim 19 wherein the drug comprises a substance selected from the group consisting of antiallergics, analgesics, bronchodilators, antihistamines, antiviral agents, antitussives, anginal preparations, antibiotics, antiinflammatories, immunomodulators, 5-lipoxygenase inhibitors, leukotriene antagonists, phospholipase A 2 inhibitors, phosphodiesterase IV inhibitors, peptides, proteins, steroids, vaccine preparations and combinations of any two or more of the foregoing.

22. The method as defined in claim 19 wherein the drug comprises a substance selected from the group consisting of adrenaline, albuterol, atropine, beclomethasone dipropionate, budesonide, butixocort propionate, clemastine, cromolyn, epinephrine, ephedrine, fentanyl, flunisolide, fluticasone, formoterol, ipratropium bromide, isoproterenol, lidocaine, morphine, nedocromil, pentamidine isoethionate, pirbuterol, prednisolone, salmeterol, terbutaline, tetracycline, 4-amino- α , α , 2-trimethyl-1H-imidazo[4,5-c]quinoline-1-ethanol, 2,5-diethyl-10-oxo-1,2,4-triazolo[1,5-c]pyrimido[5,4-b][1,4]thiazine, 1-(1-ethylpropyl)-1-hydroxy-3-phenylurea and pharmaceutically acceptable salts and solvates thereof, and combinations of any two or more of the foregoing.

23. The method as defined in claim 19 wherein the drug comprises a substance selected from the group consisting of beclomethasone dipropionate, butixocort propionate, pirbuterol, 4-amino- α , α , 2-trimethyl-1H-imidazo[4,5-c]quinoline-1-ethanol, 2,5-diethyl-10-oxo-1,2,4-triazolo[1,5-c]pyrimido[5,4-b][1,4]thiazine, 1-(1-ethylpropyl)-1-hydroxy-3-phenylurea, and pharmaceutically acceptable salts and solvates thereof, and combinations of any two or more of the foregoing.
24. The method as defined in claim 19 wherein the drug is in solution.
25. The method as defined in claim 19 wherein the drug is in suspension.
26. The method as defined in claim 25 wherein the drug comprises particles having a diameter of less than about 10 micrometers.
27. The method as defined in claim 19 wherein the medicinal composition is in a form that can be administered as an aerosol.
28. A method for the manufacture of a medicinal composition comprising:
- (a) Providing a biocompatible polymer comprising oligolactic acid;
 - (b) Acetylating the biocompatible polymer to provide acetyl oligolactic acid and a mixed anhydride of acetyl oligolactic acid and acetic acid;
 - (c) Reacting the mixed anhydride with a tertiary alcohol to provide an ester that can be chemically converted to an acid comprising acetyl oligolactic acid in the absence of water;
 - (d) Converting the ester to acetyl oligolactic acid; and
 - (e) Combining the acetyl oligolactic acid with a drug to provide the medicinal composition.
29. The method as defined in claim 28 wherein reacting the mixed anhydride with a tertiary alcohol comprises reacting the mixed anhydride with an alcohol selected from the group consisting of benzyl alcohol, t-butanol, derivatives of benzyl alcohol, derivatives of t-butanol and combinations of two or more of the foregoing.

30. The method as defined in claim 28 wherein the drug comprises a substance selected from the group consisting of antiallergics, analgesics, bronchodilators, antihistamines, antiviral agents, antitussives, anginal preparations, antibiotics, antiinflammatories, immunomodulators, 5-lipoxygenase inhibitors, leukotriene antagonists, phospholipase A 2 inhibitors, phosphodiesterase IV inhibitors, peptides, proteins, steroids, vaccine preparations and combinations of any two or more of the foregoing.

31. The method as defined in claim 28 wherein the drug comprises a substance selected from the group consisting of adrenaline, albuterol, atropine, beclomethasone dipropionate, budesonide, butixocort propionate, clemastine, cromolyn, epinephrine, ephedrine, fentanyl, flunisolide, fluticasone, formoterol, ipratropium bromide, isoproterenol, lidocaine, morphine, nedocromil, pentamidine isoethionate, pirbuterol, prednisolone, salmeterol, terbutaline, tetracycline, 4-amino- α , α , 2-trimethyl-1H-imidazo[4,5-c]quinoline-1-ethanol, 2,5-diethyl-10-oxo-1,2,4-triazolo[1,5-c]pyrimido[5,4-b][1,4]thiazine, 1-(1-ethylpropyl)-1-hydroxy-3-phenylurea and pharmaceutically acceptable salts and solvates thereof, and combinations of any two or more of the foregoing.

32. Method as defined in claim 28 wherein the drug comprises a substance selected from the group consisting of beclomethasone dipropionate, butixocort propionate, pirbuterol, 4-amino- α , α , 2-trimethyl-1H-imidazo[4,5-c]quinoline-1-ethanol, 2,5-diethyl-10-oxo-1,2,4-triazolo[1,5-c]pyrimido[5,4-b][1,4]thiazine, 1-(1-ethylpropyl)-1-hydroxy-3-phenylurea, and pharmaceutically acceptable salts and solvates thereof, and combinations of any two or more of the foregoing.

33. The method as defined in claim 28 wherein the drug is in solution.

34. The method as defined in claim 28 wherein the drug is in suspension.

35. The method as defined in claim 34 wherein the drug comprises particles having a diameter of less than about 10 micrometers.

36. The method as defined in claim 28 wherein the medicinal composition is in a form that can be administered as an aerosol.